

United States Preliminary Views

On

WRC-2000

Attached are the preliminary views of the United States concerning the 2000 World Radiocommunication Conference (WRC-2000). These views reflect deliberations in the United States as of 11 September 1998 and will be kept up to date as the United States preparatory process continues.

The United States intends to take into account comments and views expressed by other administrations as progress in proposal development continues.

The document as a whole and each of the individual views have been annotated to indicate the date of its last revision.

WRC-2000 AGENDA ITEM 1.2: *to finalize remaining issues in the review of Appendix S3 to the Radio Regulations with respect to spurious emissions for space services, taking into account Recommendation 66 (Rev. WRC-97) and the decisions of WRC-97 adoption of new values, due to take effect at a future time, of spurious emissions for space services;*

ISSUE: Revision of Appendix S3, spurious emissions for space services, radar systems, and very narrowband or unmodulated signals.

BACKGROUND: Recommendation No. 66 (Rev. WRC-97) directs the ITU-R to submit a report to WRC-99[2000] with a view to finalizing the space services spurious emissions limits in Appendix S3 of the Radio Regulations. The current RR text lists space services spurious emissions as design objectives that will become limits if not changed by the next WRC. Current studies show that these limits are achievable.

TG1/5 recommended, however, that amateur earth stations below 30 MHz be required to meet the limits applying to other amateur terrestrial systems.

Furthermore, modifications to Appendix S3 made at WRC-97 could be wrongly interpreted in two provisions pertaining to radar systems. First, the limits on systems installed on or before 1 January 2003 were not intended to apply to radars; however, the wording in Section 1, paragraph 6 could be read as applying the limits to radars. Second, Section 2, paragraph 8 indicates that the e.i.r.p. measurement method can be used when it is not possible to measure the power applied to the antenna transmission line. Because there are many radar systems where the antenna attenuates the spurious signals, measurement of the power applied to the antenna transmission line may be “possible” but not “appropriate.” For this reason, common practice is to measure all radars using the e.i.r.p. method and should be indicated in the Appendix.

Lastly, difficulties may be experienced in applying Appendix S3 to very narrowband or unmodulated signals because of the current approach of approximating where spurious emissions start as approximately 250% of the necessary bandwidth.

U.S. PRELIMINARY VIEW: The United States supports removal of the “design objectives” designation from the space services spurious emissions limits given that the limits and reference bandwidth remain as agreed at WRC-97. Also, the United States supports covering amateur earth stations below 30 MHz under the limits applying to other amateur terrestrial systems.

Furthermore, it supports modification to Appendix S3 to make it clear that no limits apply to radar systems installed on or before 1 January 2003 and that the e.i.r.p. method can be used on radars.

The United States also supports using the amplifier bandwidth as the necessary bandwidth for determining where to begin measuring spurious emissions for very narrowband or unmodulated signals.

(12August98)

WRC-2000 AGENDA ITEM 1.3: *to consider the results of ITU-R studies in respect of Appendix S7/28 on the method for the determination of the coordination area around an earth station in frequency bands shared among space services and terrestrial radiocommunication services, and to take the appropriate decision to revise this Appendix;*

ISSUE: The revision of Appendix S7.

BACKGROUND: Appendix S7 provides the method for determining the coordination area around an earth station. The appendix has not been updated in many years, though changes have been made to the associated recommendations (ITU-R Recommendations IS. 847-850). Work in TG1/6 is aimed at 1) updating the system characteristics that are used; 2) considering new approaches to handling new propagation information and other probabilistic factors; and 3) extending the frequency range to which the recommendations apply.

The TG1/6 review has identified some potential difficulties. In the past, propagation and probabilistic factors have been lumped together. TG1/6 is currently considering methods to separate these aspects. Though Appendix S7 has been successfully used for years without identifying the probabilistic component, the separation of the factors may lead to concern from services that do not like to consider their protection in terms of probability. However, without the probabilistic component new approaches for dealing with propagation may lead to an unnecessary increase in the size of coordination areas. Furthermore, there may not be a clear benefit to extending the frequency range below 1000 MHz. Also, if used to update Appendix S7, ITU-R Recommendation IS. 847 in the context of transportable equipment may not be properly applied near land boundaries between administrations.

U.S. PRELIMINARY VIEW: The United States supports the updating of Appendix S7 using the improved techniques given in ITU-R Recommendations IS. 847 through 850 as a basis, by using updated system characteristics, and by extending the frequency range upward. However, the United States is concerned about the work of TG1/6 as it pertains to new approaches for dealing with probabilistic and propagation components, extension of the frequency range below 1000 MHz, and the potential use of ITU-R Recommendation IS. 847 for transportable equipment. The United States recognizes that the existing methodology in Appendix S7 has worked well and that unnecessary larger coordination areas may result from separating the propagation and probability considerations. This issue has not yet been resolved and the United States will continue to participate in the development of appropriate methods. (3September98)

WRC-2000 AGENDA ITEM 1.4: *to consider issues concerning allocations and regulatory aspects related to Resolutions 126 (WRC-97) (COM5-11), 726 (WRC-97) (COM5-12), 128 (WRC-97) (COM5-16), 129 (WRC-97) (COM5-17), 133 (WRC-97) (COM5-28) and 134 (WRC-97) (COM5-29);*

ISSUE: Allocation of the Fixed Service in the Band 31.8-33.4 GHz and Identification of the Band for High Density Systems

BACKGROUND: WRC-97 added a fixed service allocation to the band 31.8-33.4 GHz and identified it via RR S5.547, as available for use by high-density systems. Since no studies had been performed within the ITU-R to verify the compatibility of such systems with the operations of other allocated services, WRC-97 choose to delay until 2001 implementation of the allocation via RR S5.547A and Resolution 126 (COM 5-11). The band is currently used worldwide for airborne radionavigation systems critical to safety and operations related to ground mapping, weather avoidance and calibration of aircraft on-board navigation systems for accurate aerial delivery in adverse weather. Furthermore, at specific sites around the world the 31.8-32.3 GHz portion of the band is used for reception of space research signals from deep space that carries data essential to the function and experiments of deep space probes.

PRELIMINARY VIEW: Given the availability of higher and lower frequencies for high density fixed systems, the characteristics of the radionavigation equipment, and the fact that this is the only radionavigation allocation in this portion of the spectrum, WRC-2000 should require that technical studies demonstrate that such fixed systems can operate compatibly with existing airborne radionavigation systems before implementing a fixed service allocation. These studies must account for the mobile requirements of aeronautical radionavigation and large line-of-sight distances associated with these operations. Furthermore, the studies must determine methods to be used to ensure protection of space research sites (deep space). (22May98)

ISSUE: Use of the band 40.5-42.5 GHz by the FSS, including review of the allocation to the FSS in the band 40.5-42.5 GHz and the provisional application date of 1 January 2001 of this allocation in Regions 1 and 3, taking full account of the requirements of the other services to which the band is allocated and the available ITU-R studies.

BACKGROUND: At WRC-97, the United States proposed that an FSS primary allocation be added to the bands 40.5 to 42.5 GHz. The proposal was adopted by all Region 2 countries at the Conference. It was also adopted by most countries of Region 3 and all Arab countries and some African countries in Region 1.

In light of the use of the band 37-40 GHz by the Fixed Service (FS) around the world, the 40.5-42.5 GHz band was identified as a candidate band within the range 30-50 GHz for the FSS in the space-to-Earth direction to provide flexibility in implementing future FSS systems.

The United States is in the process of addressing co-channel and adjacent channel sharing issues. To this end the U.S. is participating in the studies that are being conducted in Working Party

(WP) 4A and WP 4/9S in accordance with the provisions of Resolution 129 (WRC-97).

With regard to sharing issues with the radio astronomy service in the adjacent band, the United States is actively participating in Working Party 7D. This group's responsibilities regarding Agenda Item 1.4 is to conduct ITU-R studies pursuant to Resolution 128 (WRC-97). It is studying the potential for harmful interference from space stations in the FSS (space-to-Earth) operating in the band 41.5-42.5 GHz to the Radio Astronomy service operating in the 42.5-43.5 GHz band. WP 7D, with the help of SGs 1, 3 and 4 are to identify technical and operational measures that may be taken to protect RA station operations, including geographical separation and out-of-band emission limits to FSS space stations operating in the 41.5-42.5 GHz band, as well as measures that may be implemented to reduce the susceptibility of stations in the RA service to harmful interference. These studies have not yet been completed.

PRELIMINARY VIEW: The United States supports the worldwide allocation of the 40.5-42.5 GHz band for FSS in accordance with the following three principles:

1. The U.S. supports the allocation of the 40.5-42.5 GHz band worldwide to the FSS at WRC-2000 with an implementation in the year 2000 (see Resolution 134 (WRC-97)), recognizing that fixed-satellite systems in the band 41.5-42.5 GHz shall not be implemented until technical and operational measures have been identified and agreed within ITU-R to protect radio astronomy service from harmful interference in the band 42.5-43.5 GHz.
2. The U.S. continues to participate in sharing studies relative to sharing in this band between the FSS and terrestrial services. These studies will take due account of Resolution 129 and 133 from WRC-97.
3. The allocation to the FSS on a worldwide basis should afford adequate protection to the Radio Astronomy service in the adjacent band (42.5-43.5 GHz) in accordance with Resolution 128 (WRC-97), noting that it would be appropriate for the Radio Astronomy service to investigate ways to reduces its susceptibility to harmful interference. **(8September98)**

WRC-2000 AGENDA ITEM 1.5: *to consider regulatory provisions and possible additional frequency allocations for services using high altitude platform stations, taking into account the results of ITU-R studies conducted in response to Resolution 122 (WRC-97) (COM5-7);*

ISSUE: Matters related to high-altitude radio-relay platforms

BACKGROUND: At WRC-97, the bands 47.2-47.5 GHz and 47.9-48.2 GHz (which were already allocated for the Fixed Service) were designated for High-Altitude Radio-Relay Platform Stations (HAPS). While a designation does not limit the use of a band by types of services for which it is already allocated, it does give guidance to administrations wishing to implement specific service types. Domestically, the FCC has proposed to permit Fixed Service use, including HAPS, in the band 47.2-48.2 GHz, using five sets of two 100 MHz paired channels with each pair being separated by 500 MHz.

PRELIMINARY VIEW: The U.S. supports the WRC-97 designation of the bands 47.2-47.5 GHz and 47.9-48.2 GHz for use by HAPS. WRC-97 agreed to study how HAPS would share with other services that share these bands on a primary basis, with a view to determining if additional sharing is possible. **(20May98)**

WRC-2000 AGENDA ITEM 1.6.1: *review of spectrum and regulatory issues for advanced mobile applications in the context of IMT-2000, noting that there is an urgent need to provide more spectrum for the terrestrial component of such applications and that priority should be given to terrestrial mobile spectrum needs, and adjustments to the Table of Frequency Allocations as necessary;*

ISSUE: High Altitude Platforms (HAPS) in the terrestrial component of IMT-2000 (Matters related to IMT-2000)

BACKGROUND: Following WRC-97's designation of the bands 47.2 - 47.5 GHz and 47.9 - 48.2 GHz for use by HAPS in the fixed service, a number of administrations expressed interest in the ability of HAPS to provide terrestrial IMT-2000 mobile and fixed wireless access services. Because WRC-97 adopted RR S4.15A providing that "Transmissions to or from high altitude platform stations shall be limited to bands specifically identified in Article S5", it will be necessary to obtain a change to the Table of Frequency Allocations at WRC-99 to provide for the optional use of HAPS terrestrial IMT-2000 systems. Agenda Item 1.6.1 provides in pertinent part for "review of ... regulatory issues for advanced mobile applications in the context of IMT-2000 ... and adjustments to the Table of Frequency Allocations as necessary." The use of HAPS in the terrestrial component of IMT-2000 is a regulatory issue that will require an adjustment to the Table within Agenda Item 1.6.1.

The United States submitted a contribution to the 27 April - 8 May meeting of TG 8/1 (Doc. 8-1/80) entitled working document toward a preliminary draft new recommendation on operational and technical characteristics for a terrestrial IMT-2000 system using high altitude platform stations that described characteristics of HAPS in the terrestrial component of IMT-2000 and that provided a PDNR proposing that HAPS be included as a station within the bands already identified for use by the terrestrial component of IMT-2000 (1885-1980 MHz, 2010-2025 MHz, and 2110-2170 MHz in Regions 1 and 3; and 1885-1980 MHz and 2110-2160 MHz in Region 2), subject to operating and sharing studies. The TG8/1 meeting determined that HAPS is a new technology that may provide benefits as a low cost, large area coverage, delivery vehicle for IMT-2000 terrestrial service. TG 8/1 established a Correspondence Group to study the operating and sharing characteristics of HAPS within the bands already identified for use by the terrestrial component of IMT-2000 in order to prepare contributions to the next meeting of TG 8/1 in November 1998.

PRELIMINARY VIEW: The United States supports the TG 8/1 studies concerning operating and sharing characteristics of HAPS IMT-2000 in the bands 1885-1980 MHz, 2010-2025 MHz, and 2110-2170 MHz in Regions 1 and 3; and 1885-1980 MHz and 2110-2160 MHz in Region 2. The United States will actively participate in the HAPS IMT-2000 Correspondence Group and encourages CITEL and other administrations to do so as well. Upon acceptance of HAPS TG8/1 study results, the United States may consider the recognition of HAPS as an option available to administrations in deploying terrestrial IMT-2000 systems. (11September98)

WRC-2000 AGENDA ITEM 1.8: *to consider regulatory and technical provisions to enable earth stations located on board vessels to operate in the fixed-satellite service networks in the bands 3 700 - 4 200 MHz and 5 925 - 6 425 MHz, including their coordination with other services allocated in these bands;*

ISSUE: Regulatory and technical provisions to enable earth stations located on board vessels to operate in the fixed-satellite service networks in the bands 3700-4200 MHz and 5925-6425 MHz

BACKGROUND: This item concerns provision of broadband communications in the maritime context by earth stations on board vessels using frequencies and existing space segment in the fixed-satellite service. These facilities operate in three distinct modes: (i) at sea, (ii) while stationary in port, and (iii) in-motion along designated sea lanes while approaching or departing from port. The item is assigned to ITU-R Study Group 4-9S; Study Group 1 is listed as an interested group to provide guidance on associated regulatory issues. A Draft New Report (Doc. 4-9S/TEMP/39) contains the working plan for a Correspondence Group to complete all associated technical studies by the next international WP 4-9S meeting.

PRELIMINARY VIEW: The U.S. considers that operations at sea (beyond the as-yet-to-be-determined distance for near-shore coordination) by earth stations on board vessels in the fixed-satellite service do not present potential for interference to terrestrial stations and need not be coordinated. Operations while these facilities are stationary in port are being coordinated in the U.S. as fixed-satellite earth stations. However, from a regulatory point-of-view, it has not yet been determined whether port-side operations will be considered as “fixed earth stations” or as “temporary fixed earth stations”. Other technical and regulatory issues remaining for resolution concern the potential for interference between in-motion operations aboard ships that are underway between port and “at sea” (currently operated on a secondary basis) and terrestrial stations in the fixed service. This view is consistent with the work plan adopted for the Correspondence Group. **(3June98)**

WRC-2000 AGENDA ITEM 1.9: *take into account the results of ITU-R studies in evaluating the feasibility of an allocation in the space-to-Earth direction to the mobile-satellite service in a portion of the 1 559 - 1 567 MHz frequency range, in response to Resolutions 213 and 220 (WRC-97) (COM5-31);*

ISSUE: Mobile-Satellite Service (MSS) uplink at 1675-1710 MHz

BACKGROUND: At WARC-92, a Region 2 allocation for the Mobile-Satellite Service was made at 1670-1710 MHz for uplinks. At that time a corresponding downlink was allocated at 1492-1525 MHz. However, no MSS use of these allocations have been made. At WRC-97, proposals were submitted to use the 1559-1567 MHz band as a downlink to pair with a portion of the 1670-1710 MHz band for uplink. This proposal was not adopted by WRC-97.

The U.S. has an extensive network of Meteorological Aids (MetAids) operations operating between 1670 and 1683 MHz. MSS uplinks are not compatible with these operations. Under domestic law the 1670-1675 MHz portion is to be vacated by MetAids putting increased importance on maintaining the 1675-1683 MHz portion for MetAids. Sharing between MSS uplinks and Meteorological-Satellite (MetSat) receivers operating above 1683 MHz may be possible under some circumstances.

The U.S. is working in WP8D and SG7 and elsewhere to document MetAids and MetSat operations in this band.

PRELIMINARY VIEW: There is a need to continue to have spectrum available and to protect the operation of the Met Aids and MetSat services. Possibly there could be some use of the 1683-1710 MHz band by MSS under a sharing arrangement with MetAids and MetSats. **(3June98)**

ISSUE: Mobile-Satellite Service (MSS) downlink at 1559-1567 MHz

BACKGROUND: The band 1559-1610 MHz is allocated to Radionavigation Satellite Service and the Aeronautical Radionavigation Service. A U.S., as well as an ICAO objective, is the implementation of a global navigation satellite system (GNSS) that can support aeronautical safety in all phases of flight. GNSS implementation will require use of the 1559-1610 MHz band. A principal system operating in this band today is GPS, a worldwide free-of-charge utility that is being used increasingly for critical, high-payoff geolocation and timing functions. GPS will be an element of GNSS. There are many types of GPS receivers and applications, including aeronautical radionavigation for all phases of flight, maritime, and uses on land such as surveying, automobiles and scientific investigations. Systems that augment GPS in critical applications are developing. Some of these systems are planned to operate using frequencies in the lower end of the 1559-1610 MHz band. These systems would be blocked by a MSS allocation. In addition, there are new RNSS systems being proposed that would operate in the 1559-1567 MHz band, such as the European Space Agency ENSS satellite system. These systems also are anticipated to be part of the GNSS.

WRC-97 adopted RES 220 in response to a proposal to add an allocation to the 1559-1567 MHz band for the Mobile-Satellite Service. ITU-R WP8D has been tasked with performing studies to determine if sharing between MSS and ARNS/RNSS is feasible. The U.S. is working in WP8D and ICAO to document GPS requirements and the requirements for new systems in this band. Studies are underway to determine interference requirements of a broad range of GPS receivers covering safety and non-safety applications. The required studies will be complete prior to WRC-2000.

Further work including a measurement program is planned for the next WP8D meeting.

PRELIMINARY VIEW: Based on the information currently available, considering present and future requirements of the radionavigation satellite services and in particular civil aviation, there is a need to retain the 1559-1610 MHz band for exclusive use by Aeronautical Radionavigation Service (ARNS) and the Radionavigation Satellite Service (RNSS). It is essential that ARNS/RNSS be protected from harmful interference from MSS operations in this band in accordance with RR S4.10. The U.S. is continuing its investigation of this situation in accordance with RES 220. **(3June98)**

WRC-2000 AGENDA ITEM 1.10: *to consider results of ITU-R studies carried out in accordance with Resolution 218 (WRC-97) (COM5-5-24) and take appropriate action on this subject;*

ISSUE: Use of the bands 1525-1559 MHz and 1626.5-1660.5 MHz by the Mobile-Satellite Service while ensuring the availability and integrity of safety communications

BACKGROUND: The generic MSS allocation, which was adopted at WRC-97, is intended to alleviate the current spectrum congestion for existing and planned MSS systems. Protection was afforded to the Global Mobile Distress and Safety System (GMDSS) and the Aeronautical Mobile-Satellite (Route) Service by footnotes S5.353A, S5362A and S5362B, respectively. These footnotes do not mandate that MSS service providers provide AMS(R)S communications. Without this mandate, civil aviation can be blocked from having satellite safety communications available if the MSS service providers choose not to provide AMS(R)S communications in the portion of the bands allocated for this purpose. ITU-R studies currently focus on determining the amount of spectrum these safety-of-life GMDSS and AMS(R)S services require in the 1525-1559/1626.5-1660.5 MHz bands and to determine how to accomplish prioritization, real-time pre-emptive access and, if necessary, interoperability between different mobile-satellite systems for GMDSS and AMS(R)S, in order to achieve the most flexible and practical use of the generic MSS allocations.

PRELIMINARY VIEW: The footnotes containing the protection for the safety-of-life services from MSS interference must be reviewed, and, if necessary, revised to ensure the availability and integrity of safety communications.

WRC-2000 AGENDA ITEM 1.11: *to consider constraints on existing allocations and to consider additional allocations on a worldwide basis for the non-geostationary (non-GSO) MSS below 1 GHz, taking into account the results of ITU-R studies conducted in response to Resolutions No. 214 (Rev.WRC-97) and 219 (WRC-97);*

ISSUE: Allocation below 1 GHz to NGSO MSS downlinks at 405-406 MHz.

BACKGROUND: At WRC-97, the U.S., World Meteorological Organization (WMO), and other countries drafted Resolution 219 (WRC-97) calling for a study of the possible allocation of the 405-406 MHz band for MSS at WRC-99. The 401-406 MHz band is currently allocated to the Meteorological Aids Service. ITU-R studies are ongoing to determine the feasibility and cost of transitioning the Meteorological Aids Service out of the 405-406 MHz band.

PRELIMINARY VIEW: The U.S. is considering an allocation in the NVNG MSS in the 405-406 MHz band pending the results of ITU-R studies. A possible transition plan and a date by which MetAids could migrate from the 405-406 MHz and NVNG MSS operations could commence are yet to be established. In order to protect SARSAT (406-406.1 MHz) and Radio Astronomy (406.1-410 MHz) bands from NVNG MSS out-of-band emissions, a 30 to 50 kHz guard band near the upper band edge may be required. **(12August98)**

ISSUE: Additional allocations to NVNG MSS in the 450-470 MHz band.

BACKGROUND: The position of the incumbents in this band is that the NVNG MSS industry did not adequately demonstrate that sharing in the 450-470 MHz band is possible. It is the view of the NVNG MSS industry that the provision of land mobile systems' technical parameters is required to demonstrate that sharing is feasible.

PRELIMINARY VIEW: The feasibility of MSS and land mobile sharing in the 450-470 MHz band requires further study. Based on the results of studies being conducted, the U.S. will determine whether to pursue MSS allocations in this band. **(12August98)**

WRC-2000 AGENDA ITEM 1.13: *on the basis of results of the studies in accordance with Resolutions 130(WRC-97), 131(WRC-97), and 538(WRC-97):*

1.13.1: *to review and, if appropriate, revise the power limits appearing in Articles S21 and S22 in relation to the sharing conditions among non-GSO FSS, GSO FSS, GSO broadcasting-satellite service(BSS), space sciences and terrestrial services, to ensure the feasibility of these power limits and that these limits do not impose undue constraints on the development of these systems and services;*

1.13.2: *to consider the inclusion in other frequency bands of similar limits in Articles S21 and S22, or other regulatory approaches to be applied in relation to sharing situations;*

ISSUE: Regulatory and technical provisions to enable sharing among non-GSO FSS, GSO FSS, GSO BSS, space sciences and terrestrial services.

BACKGROUND: WRC-97 adopted provisional power flux density limits in certain frequency bands which would apply to non-GSO FSS systems to protect GSO FSS networks, and GSO BSS networks. Resolution 130 (WRC-97), *Use of Non-Geostationary Systems in the Fixed-Satellite Service in Certain Frequency Bands* and Article S22.2 of the Radio Regulations contain provisional limits corresponding to an interference level caused by one NGSO system in the frequency bands 10.7-12.75 GHz, 17.8-18.6 GHz, and 19.7-20.2 GHz. Resolution 538, *Use of the Frequency Bands Covered by Appendices 30 and 30A by Non-GSO Systems in the Fixed-Satellite Service*, and Article S22 contain limits corresponding to an permissible levels of interference level from a NGSO system into a GSO BSS network. Resolution 131 (WRC-97), *Power Flux-Density Limits Applicable to Non-GSO FSS Systems for Protection of Terrestrial Services in the Bands 10.7-12.75 GHz and 17.7-19.3 GHz*, and Article S21 contain limits to protect terrestrial services. Resolution 131 requests review of the provisional limits and calls for further study of non-provisional pfd limits.

PRELIMINARY VIEW:

1. The U.S. continues to review the power limits -- both the provisional limits adopted in Article S22 and those contained in WRC-97 Resolutions 130 and 538, and the limits in Article S21 and WRC-97 Resolution 131 -- with the intent of protecting the GSO FSS, GSO BSS, space sciences, and terrestrial services while allowing the introduction of NGSO FSS systems.
2. The APFD definition in the Radio Regulations should be modified to take into account the normalized directivity of the GSO satellite antenna. (For ease of computation, the WRC-97 APFD definition did not take into account the GSO satellite antenna pattern.) The corresponding APFD limits would consist of several values that are associated with various GSO satellite reference antenna patterns. Due to the differing spacecraft design practices in Ku- and Ka-bands, the antenna directivity patterns may vary with frequency band.
3. GSO systems operating in slightly inclined orbits constitute an important subgroup of all operational satellites and need to be protected from NGSO interference.

4. Outside of those bands where provisional power limits were adopted by WRC-97, no technical basis has been established for consideration by WRC-2000 of the power limits approach to sharing between and/or among NGSO FSS systems and GSO FSS, GSO BSS, space sciences, and/or terrestrial services systems. Therefore, the U.S. opposes general application of power limits outside those bands where provisional power limits were adopted at WRC-97.

5. Sharing with satellite systems in “quasi-geostationary satellite orbit” needs to be considered within this agenda item.

Further views are given below grouped by issue.

NGSO/GSO

6. There will be a need for an alternative approach to facilitate sharing in some specific situations. The provisional eirp limits and associated time allowances may not adequately protect existing GSO FSS networks with large earth station antennas (large earth station antennas will be defined as a result of technical work within the ITU-R). The U.S. favors coordination between NGSO FSS networks and these GSO FSS networks.

NGSO/BSS

7. The study of the provisional power flux-density limits by the ITU-R and the review of these limits by WRC-2000 must ensure protection of modifications to the BSS Plans, including currently pending modifications and future modifications to the Plans.

8. The majority of BSS systems that have been implemented, or will be implemented in the future, are modifications to the Plans. In addition, more than three years can lapse between the submission of Annex 2 information regarding proposed modifications to the Plans by an administration, and the actual publication of this information by the BR. This can result in substantial delays in completion of the modification process, even for modifications of existing frequency assignments. WRC-97 (in both Resolution 538 and Resolution 721, agenda item 1.13) clearly foresaw the need to protect future modifications to the Plans from NGSO FSS systems, and to ensure that these limits do not impose undue constraints on the development of these systems and services (as stated in agenda item 1.13).

NGSO/Terrestrial Services

9. Characteristics of radars currently operating in the bands 13.75-14.0 GHz have been examined. Radars operating in the 13.75-14.0 GHz band employ eirp values of up to 79 dBW. Interference from these radiolocation stations to NGSO FSS networks would appear to be probable and sharing may not be feasible.

10. Characteristics of radars currently operating in the band 17.3-17.7 GHz have been examined. Radars operating in the band 17.3-17.7 GHz employ eirp values up to 115 dBW. Sharing was found to be feasible with GSO FSS systems (Earth-to-space) if the radiolocation stations limit their emissions toward the geostationary orbit. Sharing would not appear to be feasible between radiolocation stations and NGSO FSS networks.

NGSO/Space Science Services

11. Earth stations operating in the 13.75-14.0 GHz band are technically constrained by S5.502 (minimum size of 4.5 meters; e.i.r.p. between 68 and 85 dBW), S5.503 (e.i.r.p. density in the band 13.772-13.778 MHz), and S5.503A (FSS shall not cause harmful interference to radiolocation stations installed on NGSO space stations in the space research and Earth exploration-satellite services until January 1, 2000). In addition, there are ITU-R Recommendations (e.g., ITU-R S.1068 (Fixed-satellite service and radiolocation/radionavigation services sharing in the band 13.75-14.0 GHz) and ITU-R SA.1071 (Use of the 13.75 to 14.0 GHz band by the space science services and the fixed-satellite service)) that describe sharing situations with the fixed-satellite service, including recommended limitations on the FSS. These footnotes and recommendations will have to continue to be applied to both GSO and NGSO systems operating in the band. **(3September98)**

WRC-2000 AGENDA ITEM 1.15.1: *to consider new allocations to the radionavigation-satellite service in the range from 1 to 6 GHz required to support developments;*

ISSUE: Identification of a second civilian frequency for GPS

BACKGROUND: The addition of a second frequency will greatly enhance the accuracy, reliability and robustness of civilian GPS receivers by enabling them to make more effective corrections for the distorting effects of the ionosphere on the signals from space. GPS has always provided signals on two frequencies for military users for this purpose. A second civil signal allows receivers to measure the time of arrival for two signals that have passed through the ionosphere and correct for the distortion introduced by passage from space to earth. An improved location calculation will allow safety-critical users requiring dynamic, reliable capability to use GPS, improve the overall accuracy of the system for the average user, and allow the high-accuracy users (surveying, geodesy, weather forecasters, and others) to determine their data in a faster, more reliable manner. In addition, the protected civil signal will allow the safety-critical users to have a backup signal in the event of disruption of the current civil signal, the GPS SPS. The new signals will be available to all civil users worldwide by 2005. Interest has been expressed via ICAO on the use of a second GPS civil signal in conjunction with the Japanese MSAS and the European EGNOS augmentation programs. The new signals are intended to be added to the GPS Block IIF satellites. An important consideration for aeronautical users is having the protected signal operate under a frequency allocation to the Aeronautical Radionavigation Service (ARNS), which would also include the possibility of terrestrial augmentation systems.

The U.S. is reviewing options related to the frequencies to be identified for the second and potentially a third signal to add to the Standard Positioning Service now operating on 1575.42 MHz. Further, a decision on which of these two new signals will be proposed to become the safety-of-life service signal is also under review.

PRELIMINARY VIEW: It is appropriate to identify a second RNSS frequency on a worldwide basis that can be used in conjunction with the RNSS allocation at 1559-1610 MHz for a variety of applications including aeronautical sole-means of navigation. **(8September98)**

WRC-2000 AGENDA ITEM 1.15.2: *to consider the addition of the space-to-space direction to the radionavigation-satellite service allocations in the bands 1 215 - 1 260 MHz and 1 559 - 1 610 MHz;*

ISSUE: Recognition in the allocation table of space-based RNSS receivers in the bands 1559-1610 MHz and 1215-1260 MHz

BACKGROUND: GPS receivers operating with both L1 and L2 signals are used for accurately positioning commercial and scientific spacecraft. However, the present allocation for RNSS does not afford protection for these signals. The U.S. is performing analysis to show that the GPS spaceborne receivers can operate in the current electromagnetic environment. Results of these studies show that interfering satellites would have to be located very close to the spaceborne GPS receiver for there to be a problem. Spurious emissions from MSS systems were also considered. However, the interference from an in-band MSS downlink such as has been proposed in the 1559-1567 MHz band has not been analyzed.

PRELIMINARY VIEW: It is appropriate to seek space-to-space as a directional indicator in the RNSS service in the 1559-1610 and 1215-1260 MHz bands. The U.S. will work in WP8D, SG7 and the Space Frequency Coordination Group to study compatibility with currently allocated services in these bands. The U.S. will also work in WP8D to demonstrate that use of GPS receivers on-board spacecraft will not impose additional constraints on services operating in adjacent bands. (22May98)

WRC-2000 AGENDA ITEM 1.16: *to consider allocation of frequency bands above 71 GHz to the earth exploration-satellite (passive) and radio astronomy services, taking into account Resolution 723 (WRC-97) (COM5-1);*

ISSUE: Passive Allocations above 71 GHz

BACKGROUND: The passive services, (e.g. for remote sensing, radio astronomy, and meteorological observations) have substantial interests in the above 71 GHz frequency range as well, up to the 275 GHz limit of the allocation table and beyond. The active services are interested in using this spectrum, e.g. for applications involving high data rate transmission and because propagation characteristics allow extensive frequency reuse. Few active systems, particularly satellites have been implemented to date above 71 GHz.

NASA's Mission to Planet Earth is dedicated to understanding the total Earth system and the effects of natural and human-induced changes in the global environment. Passive remote sensing is key to the study of the Earth system. Other U.S. government agencies also utilize passive sensors to study and predict the weather and for other key scientific purposes. Various missions already employ passive sensing instruments at frequencies above 71 GHz and many more are planned.

During the next two decades the U.S intends to upgrade and continue operating several millimeter wave telescopes that currently work above 71 GHz. Congress also provided funds for construction of the MilliMeter Array (MMA), which is expected to become operational by approximately 2005. Several other millimeter wave telescopes may be built in this time frame, and their access to the spectrum must be ensured.

PRELIMINARY VIEW: WRC-2000 offers an opportunity to provide additional allocations to satisfy passive service needs, to protect existing allocations for future use, and to re-organize the allocations above 71 GHz as needed so that spectrum can be successfully shared between passive and active services in that range.

The interests of other services allocated in this portion of the spectrum must also be safeguarded and satisfied as well. The United States is considering options for band reallocations that are similar to what was done at 50.2-71 GHz at WRC-97. The band re-allocation will meet the needs of all the radio services involved. (22May98)

WRC-2000 AGENDA ITEM 1.17: *to consider possible worldwide allocation for the earth exploration-satellite (passive) and space research (passive) services in the band 18.6 - 18.8 GHz, taking into account the results of the ITU-R studies;*

ISSUE: Earth exploration-satellite (passive) service allocation in the band 18.6 - 18.8 GHz

BACKGROUND: Passive spaceborne sensors provide environmental data on soil moisture, water salinity, ocean temperature, rain, snow, ice, sea state, and oil spills. A set of frequency bands is essential for these measurements because simultaneous measurements at several frequencies are needed to isolate any single effect since the energy emitted at any one frequency is determined by several overlapping effects. The band between 18.6 and 18.8 GHz is one component in this set, without which these environmental data could not be obtained. At present, the allocation for the Earth exploration-satellite (passive) service is on a primary basis in Region 2, but on a secondary basis in Regions 1 and 3.

At WRC-97, a joint CITELE proposal was presented to upgrade the allocations to the Earth exploration-satellite (passive) service to primary. This proposal also included a pfd limit of -101 dBW/m² in a reference bandwidth of 200 MHz on the fixed-satellite service. A limit of -3 dBW on the power in the band that is delivered to an antenna of a fixed service station with a -10 dBi backlobe gain was also included in the proposal. At the conference, agreement could not be reached on the appropriate limits on the fixed and fixed-satellite services to enable passive sensors to perform their mission while permitting acceptable operation of fixed and fixed-satellite service systems.

Studies are currently being conducted to determine if the limits given in the proposal at WRC-97 can be modified to allow the fixed and fixed-satellite services to use more power. These studies will be completed and limits will be identified in the fall.

PRELIMINARY VIEW: The allocation for the Earth exploration-satellite (passive) service in Regions 1 and 3 must be elevated to world-wide primary status if the long-term ability to obtain environmental data with passive spaceborne sensors is to be preserved. Compatibility between the passive sensors and the active radio services requires adoption of constraints on the parameters of the fixed and fixed-satellite service systems that use the band. Studies are currently being conducted to further assess the sharing situation and determine suitable limits. The U.S. supports an upgrade to EES (passive) in Regions 1 and 3 to world-wide primary in the band 18.6 - 18.8 GHz with appropriate world-wide constraints on all allocated services to ensure a long term sharing situation that will allow satisfactory use of the band by allocated services.
(22May98)

WRC-2000 AGENDA ITEM 1.19: *to consider the report of the IRG submitted by the Director of the Radiocommunication Bureau and determine whether it is possible to undertake replanning in accordance with Resolution 532 (WRC-97) (COM4-22) for completion by a subsequent competent conference;*

ISSUE: Increasing BSS capacity assigned to Regions 1 and 3

BACKGROUND: Resolution 532 (WRC-97) establishes an Inter-Conference Representative Group (IRG) to study the feasibility of increasing the capacity assigned to each country in Regions 1 and 3 in the BSS and feeder link Plans. WRC-2000 Agenda Item 1.19 requires that WRC-2000 determine if it is possible to undertake the re-planning.

PRELIMINARY VIEW: The U.S. supports attempting to increase the capacity assigned to each country to the equivalent of 10 analogue channels, as described in Principle 1 in Annex 1 to Resolution 532 (WRC-97). The U.S. is opposed to suppressing the existing Article 4 modification process at any time, particularly in regards to the Region 2 Plans.

Additionally, in order to be feasible, any possible replanning must protect, and not introduce additional constraints upon, Region 2 services, in accordance with Principles 7 and 8 of Annex 1 to Resolution 532 (WRC-97). The U.S. will continue to participate in further work/technical studies on issues associated with agenda item 1.19. **(20May98)**

WRC-2000 AGENDA ITEM 1.20: *to consider the issues related to the application of Nos. S9.8, S9.9 and S9.17 and the corresponding parts of Appendix S5 with respect to Appendices S30 and S30A, with a view to possible deletion of Articles 6 and 7 of Appendices S30 and S30A, also taking into consideration Recommendation 35 (WRC-95);*

ISSUE: Procedural Issues associated with Appendices S30 and S30A

BACKGROUND: Agenda Item 1.20 requires the consideration of possible merging of Articles 6 and 7 of Appendices S30 and S30A of the ITU Radio Regulations (the procedures for coordinating and notifying unplanned services with respect to the Plans) with Article S9. This agenda item may also involve general consideration of the procedures in Appendices S30 and S30A, or sharing criteria.

PRELIMINARY VIEW: Changes to the procedures, planned or unplanned procedures, could seriously impact U.S. networks, for example, through "unintended consequences" or intentional restriction of flexibility. There are changes to sharing criteria that the U.S. could support, for example Section 5 of Annex 1 to Appendix S30. There are sharing situations that are not currently addressed, that should be addressed, such as protection of the 17 GHz Region 2 BSS from modifications to the Regions 1 and 3 Plan. The U.S. could support changes to the procedures of Article 4 that would facilitate modification of the Plans. The U.S. will continue to participate in further work/regulatory/technical studies on these issues. **(20May98)**

WRC-2000 AGENDA ITEM 1.21: *consider the report from the Radiocommunication Bureau on results of the analysis in accordance with Resolution 53 (WRC-97) (COM4-20) and take appropriate actions;*

ISSUE: Report of the Director of the Radiocommunication Bureau on Compatibility of the revised (by WRC-97) Regions 1 and 3 Broadcasting-Satellite Service (BSS) Bands and Feederlink Plans

BACKGROUND: Resolution 533 (WRC-97) instructs the ITU's Radiocommunication Bureau (BR) to perform specific analyses regarding the compatibility of the new BSS Plans with other services sharing the same bands. Agenda Item 1.21 instructs WRC-2000 to review the report of the BR.

PRELIMINARY VIEW: The U.S. will follow closely the BR's analysis. The U.S. wants to ensure that all services/networks are sufficiently protected from and not unduly restricted by the new Region 1 and 3 Plans that were adopted at WRC-97. **(20May98)**

WRC-2000 AGENDA ITEM 2: *to examine the revised ITU-R Recommendations incorporated by reference in the Radio Regulations which have been communicated by the 1999 [2000] Radiocommunication Assembly, in accordance with Resolution 28 (WRC-95); and decide whether or not to update the corresponding references in the Radio Regulations, in accordance with principles contained in the Annex to Resolution 27 (Rev.WRC-97);*

ISSUE: Incorporation by Reference

BACKGROUND: A number of provisions of the Radio Regulations make reference to the ITU-R Recommendations. As the ITU-R Recommendations are updated, it is necessary to review the Radio Regulations to see if these references should be continued.

PRELIMINARY VIEW: The U.S. has examined every reference to an ITU-R Recommendation within the Radio Regulations. In each case, action is contemplated which will conclude the effort, under way since the Voluntary Group of Experts, to use incorporation by reference wherever the provision is mandatory and the specific recommendation version is cited. **(12August98)**

WRC-2000 AGENDA ITEM 6: *to identify those items requiring urgent actions by the radiocommunication study groups in preparation for the 2001 World Radiocommunication Conference (WRC-01);*

ISSUE: Possible provision on the 2001 agenda for the allocation for feeder links in bands around 1.4 GHz to NVNG MSS with service links below 1 GHz:

WRC-01 AGENDA ITEM 3: to consider the results of the studies related to the following with a view to considering them for inclusion in the agendas of future Conferences

WRC-01 AGENDA ITEM 3.5: allocations on a worldwide basis for feeder links in bands around 1.4 GHz to the non-GSO MSS systems with service links operating below 1 GHz, taking into account the results of ITU-R studies conducted in response to Resolution 127 (WRC-97)

BACKGROUND: The resolution to study the 1.4 GHz band for NGSO MSS with service links below 1 GHz was adopted at WRC-97. However, consideration of the results of studies related to that issue was placed on the WRC-01 agenda. A study in the ITU-R WP8D, that has not yet been considered by other appropriate working parties, indicates that the frequency band 1429-1432 MHz could be suitable for use by non-GSO MSS feeder downlinks and the frequency band 1390-1393 MHz could be suitable for use for non-GSO MSS feeder uplinks (See 8D/TEMP/58 Rev.1). This study was sent via liaison statement to Working Party 7C and 7D where it will be reviewed at the fall set of ITU-R meetings.

PRELIMINARY VIEW: Studies need to be completed and regulatory approach established to ensure that the radio astronomy, earth exploration-satellite (EES) and radiolocation services in the adjacent bands are not compromised. If studies are sufficiently advanced or completed prior to WRC-2000, the U.S may be in a position to request modifications to agenda items 3 and 3.5 of WRC-01. These modifications could be to ask for consideration of the allocations at WRC-01. (20August98)